

SPECTROSCOPIC CHARACTERIZATION OF SMALL POLAR IMPURITIES IN GASOLINE

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Small polar compounds in gasoline have been identified using a BrightSpec Fourier Transform Microwave Rotational Resonance (FT-MRR) spectrometer in the 260-290 GHz band with Headspace Sampling Module. The design of this spectrometer is based on segmented Chirped Pulse Fourier Transform millimeter wave (CP-FTmmW) spectroscopy, which exploits recent advances in digital electronics to allow the measurement of broadband rotational spectra in a few minutes. As part of efforts to determine applications for rotational spectroscopy to petrochemical problems, FT-MRR has been employed to record rotationally resolved spectra of small polar compounds in gasoline. Preliminary analysis of the observed features using the BrightSpec spectral database reveals a rich, but interpretable, pattern, due to the sensitivity of FT-MRR to only polar compounds. The complex hydrocarbon matrix, which in many analytical instruments obscures the signals from low concentration impurities, is nearly invisible in FT-MRR. Spectroscopic and quantitative analyses of detected polar compounds are underway and will be given in this talk.